



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------------|------------------|
| 10/067,506 | 02/07/2002 | Joichi Ushioda | 33082M120 | 7344 |
| 7590 | 05/18/2004 | | | |
| SMITH, GAMBRELL & RUSSELL, LLP Suite 800 1850 M Street, N.W. Washington, DC 20036 | | | EXAMINER KACKAR, RAM N | |
| | | | ART UNIT 1763 | PAPER NUMBER |

DATE MAILED: 05/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/067,506 | USHIODA ET AL. | |
| | Examiner | Art Unit | |
| | Ram N Kackar | 1763 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-21, 25 and 26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-21, 25 and 26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 10-11, 14-15 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamitani (US 6028762) in view of Shamouilian et al (US 6320736).

Kamitani discloses a reduced pressure plasma-processing apparatus for etching or film formation having gas supply and exhaust means (Col 1 lines 41-43), an electrostatic chuck (Fig 1B and 3) with base, conductor and dielectric film having protrusions (Fig 2B 5 and 7), heat transfer fluid (9), stepped portion along outer peripheral portion not lower than protrusions (Fig 2A) having outlets in the groove (9) and communication of outlets to region inside of the stepped portion (Fig 1A).

Kamitani does not explicitly disclose that the height of the outer stepped portion is higher than the protrusions inside.

Shamouilian et al disclose higher stepped portion at the circumference (Fig 1- 46) to make sure that the gas does not leak.

Therefore it would have been obvious for one of ordinary skill in the art to have a higher portion at the circumference to prevent leak in case manufacturing tolerance at the protrusions may allow not so good a seal at the circumference.

Art Unit: 1763

3 Claims 12-13 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamitani (US 6028762) in view of Shamouilian et al (US 6320736) as applied to claims 10-11, 14-15, 18-19 and further in view of Grimard et al (US 5903428).

Kamitani discloses a reduced pressure plasma-processing apparatus for etching or film formation having gas supply and exhaust means (Col 1 lines 41-43), an electrostatic chuck (Fig 1B and 3) with base, conductor and dielectric film having protrusions (Fig 2B 5 and 7), heat transfer fluid (9), stepped portion along outer peripheral portion not lower than protrusions (Fig 2A) having outlets in the groove (9) and communication of outlets to region inside of the stepped portion (Fig 1A). Kamitani discloses protrusion height of 5 microns or higher and discloses experiment with 30 micron (Table 4).

Kamitani and Shamouilian et al do not explicitly disclose 50-100 micron or a shape of protrusions as curved with small area of contact.

Grimard et al disclose a processing vessel having gas supply (Fig 4-410), exhaust means (416) conductor base (Fig 1-104) with dielectric film to make it an electrostatic chuck (102) where the dielectric film has protrusions of ceramic (Col 4 lines 1-3) which are curved at the top (106) with small area of contact (Fig 5-502) and have a height of 5-350 microns (Col 4 lines 15-17).

Therefore it would have been obvious for one of ordinary skill in the art to have a protrusion of small area at top so as to help in providing low restriction for cooling gas, low contamination and ease of dechucking after the completion of the process.

Art Unit: 1763

4 Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamitani (US 6028762) in view of Shamouilian et al (US 6320736) and Kitabayashi et al (US 5530616).

Kamitani discloses a reduced pressure plasma-processing apparatus for etching or film formation having gas supply and exhaust means (Col 1 lines 41-43), an electrostatic chuck (Fig 1B and 3) with base, conductor and dielectric film having protrusions (Fig 2B 5 and 7), heat transfer fluid (9), stepped portion along outer peripheral portion not lower than protrusions (Fig 2A) having outlets in the groove (9) and communication of outlets to region inside of the stepped portion (Fig 1A).

Kamitani or Shamouilian et al do not disclose protrusion pattern at 0-45 degrees.

Kitabayashi et al disclose a reduced pressure plasma-processing atmosphere (Col 1 lines 10-14) an electrostatic chuck (Col 1 lines 14-15) with base, conductor and dielectric film (Fig 1) having protrusions (5) and heat transfer fluid (6) and teach that protrusions may be arranged in many different patterns (Col 4 lines 14-15).

Therefore it would have been obvious to optimize protrusions patterns at an angle in order to get temperature and processing uniformity across the wafer.

5 Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamitani (US 6028762) in view of Shamouilian et al (US 6320736) and Kitabayashi et al (US 5530616) as applied to claim 20 and further in view of Grimard et al (US 5903428).

Kamitani, Shamouilian et al and Kitabayashi et al do not disclose shape of protrusions as curved with small area of contact.

Art Unit: 1763

Grimard et al disclose a processing vessel having gas supply (Fig 4-410), exhaust means (416) conductor base (Fig 1-104) with dielectric film to make it an electrostatic chuck (102) where the dielectric film has protrusions of ceramic (Col 4 lines 1-3) which are curved at the top (106) with small area of contact (Fig 5-502) and have a height of 5-350 microns (Col 4 lines 15-17).

Therefore it would have been obvious for one of ordinary skill in the art to have a protrusion of small area at top so as to help in providing low restriction for cooling gas, low contamination and ease of dechucking after the completion of the process.

6 Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamitani (US 6028762) in view of Shamouilian et al (US 6320736) and in view of Yukihiro Kamide (US 5306379).

Kamitani and Shamouilian et al's disclosure is stated above.

Kamitani or Shamouilian et al do not disclose rectangular base.

Yukihiro Kamide discloses a plasma processing apparatus with a rectangular base for rectangular substrates (Fig 2-71).

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to have a rectangular base in order to process rectangular substrates.

7 Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamitani (US 6028762) in view of Shamouilian et al (US 6320736) and in view of Yukihiro Kamide (US 5306379) as applied to claim 25 and further in view of Grimard et al (US 5903428).

Art Unit: 1763

Kamitani, Shamouilian et al and Yukihiro Kamide do not disclose shape of protrusions as curved with small area of contact.

Grimard et al disclose a processing vessel having gas supply (Fig 4-410), exhaust means (416) conductor base (Fig 1-104) with dielectric film to make it an electrostatic chuck (102) where the dielectric film has protrusions of ceramic (Col 4 lines 1-3) which are curved at the top (106) with small area of contact (Fig 5-502) and have a height of 5-350 microns (Col 4 lines 15-17).

Therefore it would have been obvious for one of ordinary skill in the art to have a protrusion of small area at top so as to help in providing low restriction for cooling gas, low contamination and ease of dechucking after the completion of the process.

Response to Amendment

Applicant's arguments filed 2/26/2004 have been fully considered but they are not persuasive.

Applicant's argument that inclusion of subject matter of earlier claims 24 and 29 makes these claims allowable is not correct since no claim was allowable in the last office action. The present office action relies on the prior art recited above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

Art Unit: 1763

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 571 272 1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RK


GREGORY MILLS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700